

Production of *Micrurus* snake venom in Argentina. Preliminary report.

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INTRODUCTION. In Argentina exist 8 species of snakes belonging to *Micrurus* genus, which are distributed from the North of Patagonia to the Septentrional extreme of the country (Ministerio de Salud, 2014). The accidents represent under the 0.5% of the accident by venomous snakes, nevertheless, this bite always constitute a medical emergence reason by which the antivenom is produced and freely distributed by the Ministry of Health. Its production is difficult due the low number of snakes found, their short live in captivity and the small amount of venom from the specimens (de Roodt et al., 2013). Due the drastic reduction in snakes received in the institute and found in nature, the antivenom production in a future may be negatively affected, reason by which we made a retrospective study in order to analyze historical data of snakes existence and venom production.

OBJECTIVES. In order to know the historical income of snakes to our serpentarium and the venom production, we analyzed available draft records of reception of *Micrurus* specimens and the records of milking and venom production in the INPB during the period 1991-2020.

MATERIAL AND METHODS. Data from books, sheets and notes of receipt and capture of coral snakes, milking, venom obtained, venom delivery for antivenom production and research during the period 1991-2020 were recorded and analyzed. All the data were recorded in Excel (Microsoft) sheets and ordered in files. All data were analyzed using the software Prism 6.0 for Mac (GraphPad Inc. CA). Data regarding the number of snakes received, number of milkings, number of snakes milked and used by milking, venom produced by snake and per year were recorded and when possible, these variables analyzed.

RESULTS. In this period was recorded the reception of 322 specimens (around 11/year, Md 7, min. 0, max. 76) and in 7 years, no snakes were received (Figure 1). The total reception by decade is shown in Figures 2 and 3. The reception drastically decreased, in the last three decades were received 220 (1991-2000), 89 (2001-2010) and 13 (2011-2020) coral snakes. The analysis of the decay in reception of snakes is shown in Figure 4. The analysis of the reception by decade or lustrus showed a decay in the number of *Micrurus* captured received in the Institute. This decay ranges from r^2 0.7 to over 0.9. The total amount of venom milked at least surpass the 3.6 g, but data must be re-analyzed by some incongruencies in the documentation. For the analysis only the checked and reliable documentation was considered. The number of *Micrurus* used by milking session varied from 1 to 22 snakes (Md 4), with around 2 milking sessions/year. The individual venom yield varied from 1 to 40 mg (the last in only one individual case). The yield of venom/snake (mg of venom/number of snakes milked) was 8.6 ± 5.5 (Md 8, min., 1 max. 26, 25% 4, 75% 11.7). The total number of milkings by year shown in Figure 5 and the venom yield by year is shown in Figure 6. The venom production as expected have a relation with the number of snakes milked (Figure 7).

COMMENTS. Even though this is a preliminary report based in historical registers, initial data provide a draft idea of the coral snakes reception and the *Micrurus* venom production. *Micrurus* envenoming is a medical emergency that requires the rapid use of antivenom and occasionally the use of pharmacological and mechanical support due the respiratory paralysis that can occur (Bucaretti et al., 2016). The antivenom is the only specific treatment and the most important tool to treat the envenomed patients, specially, those treated in peripheral centers where other kind of support apart the antivenom is not available. By this reason the antivenom is essential for the treatment of this type of envenomation. For the antivenom production is necessary to obtain the venom, which is a difficult task due the scarcity of snakes in nature in Argentina and due the short survival of the specimens in captivity, which limits the venom obtaining and consequently the antivenom production. We observed a strong decay in the numbers of snakes received and in the venom availability to produce the antivenom. Despite the antivenom production was regular in the last 30 years, this tendency is worrying and indicate the need for venom obtaining, to improve the immunization procedures for antivenom obtaining and to strengthen the medical pharmacological and mechanical treatment for this envenomation.

FIGURE 1

Micrurus specimens received during the period 1991-2020

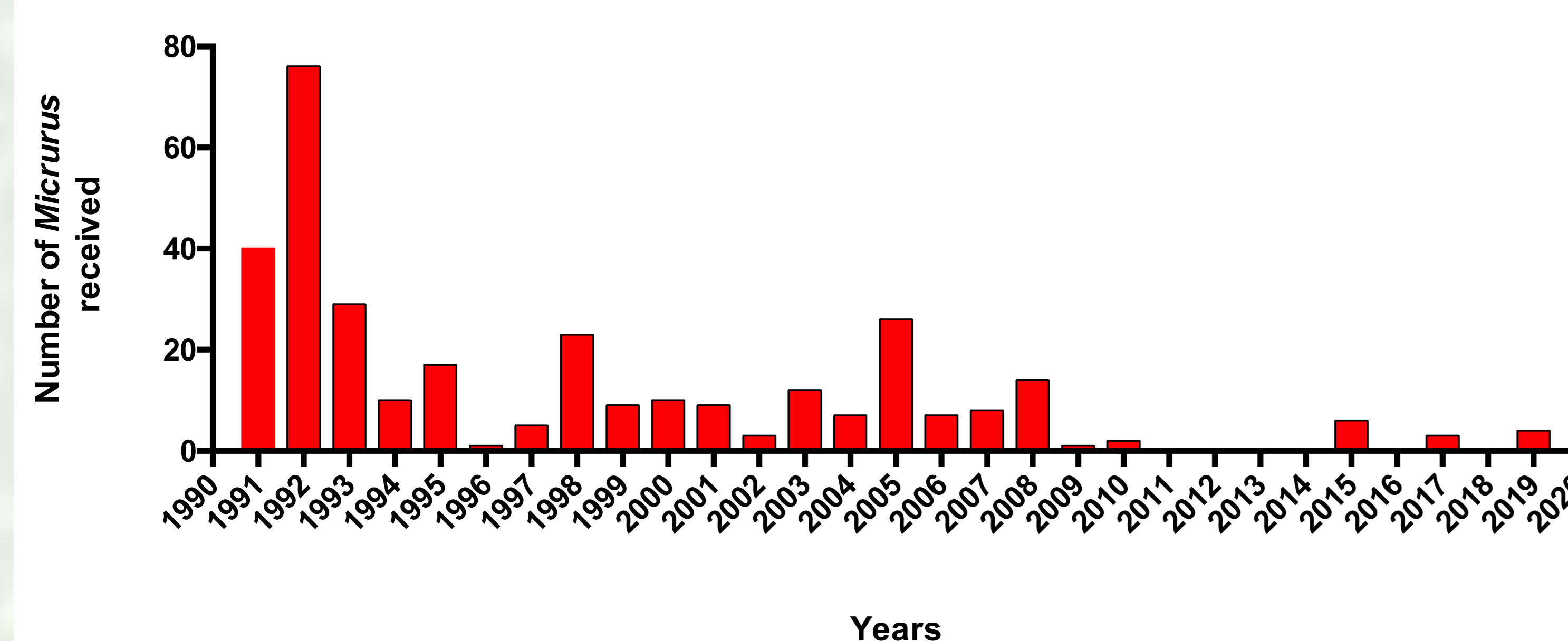


FIGURE 2

Specimens received by decade

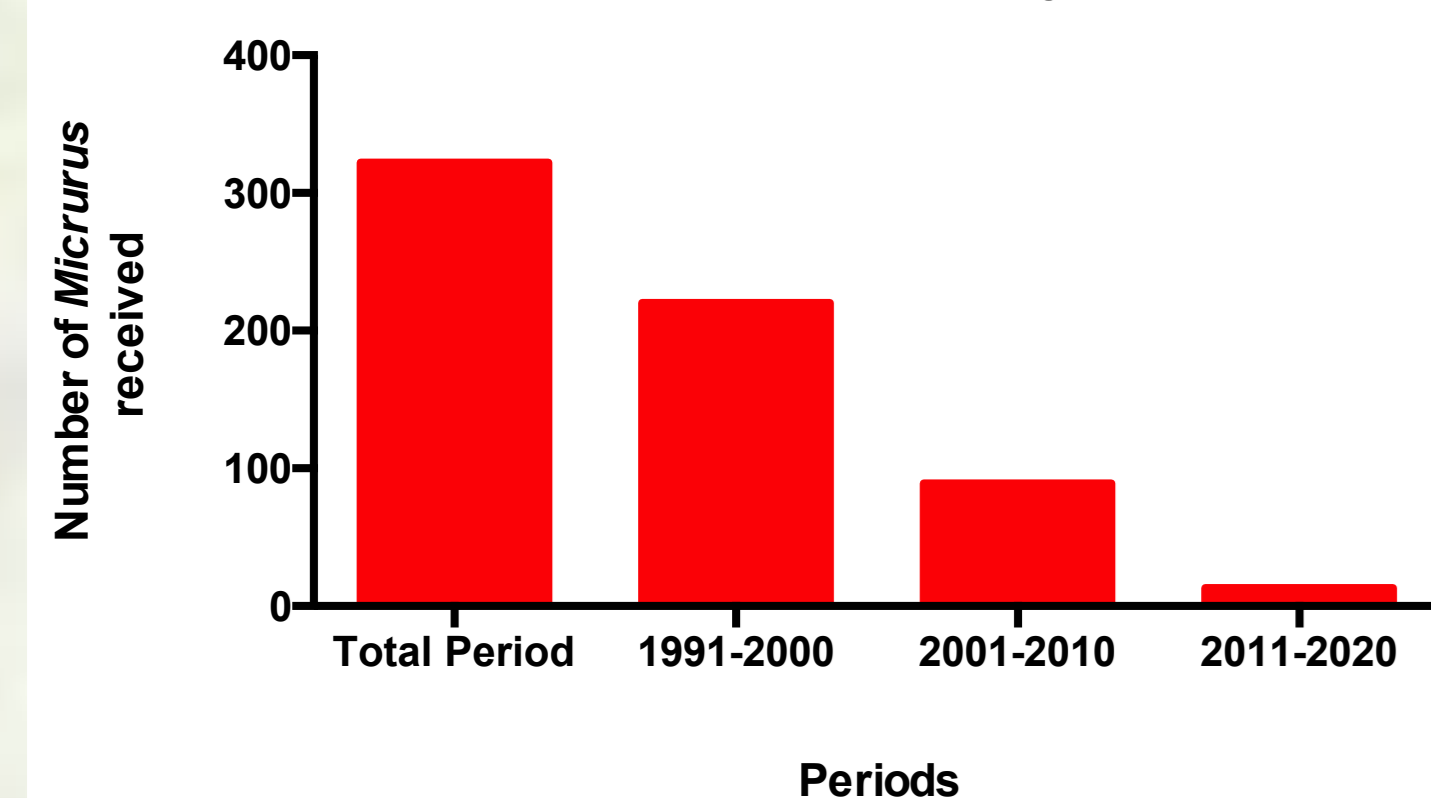


FIGURE 3

Detail of snake reception by periods



FIGURE 4

Reception in the last three decades

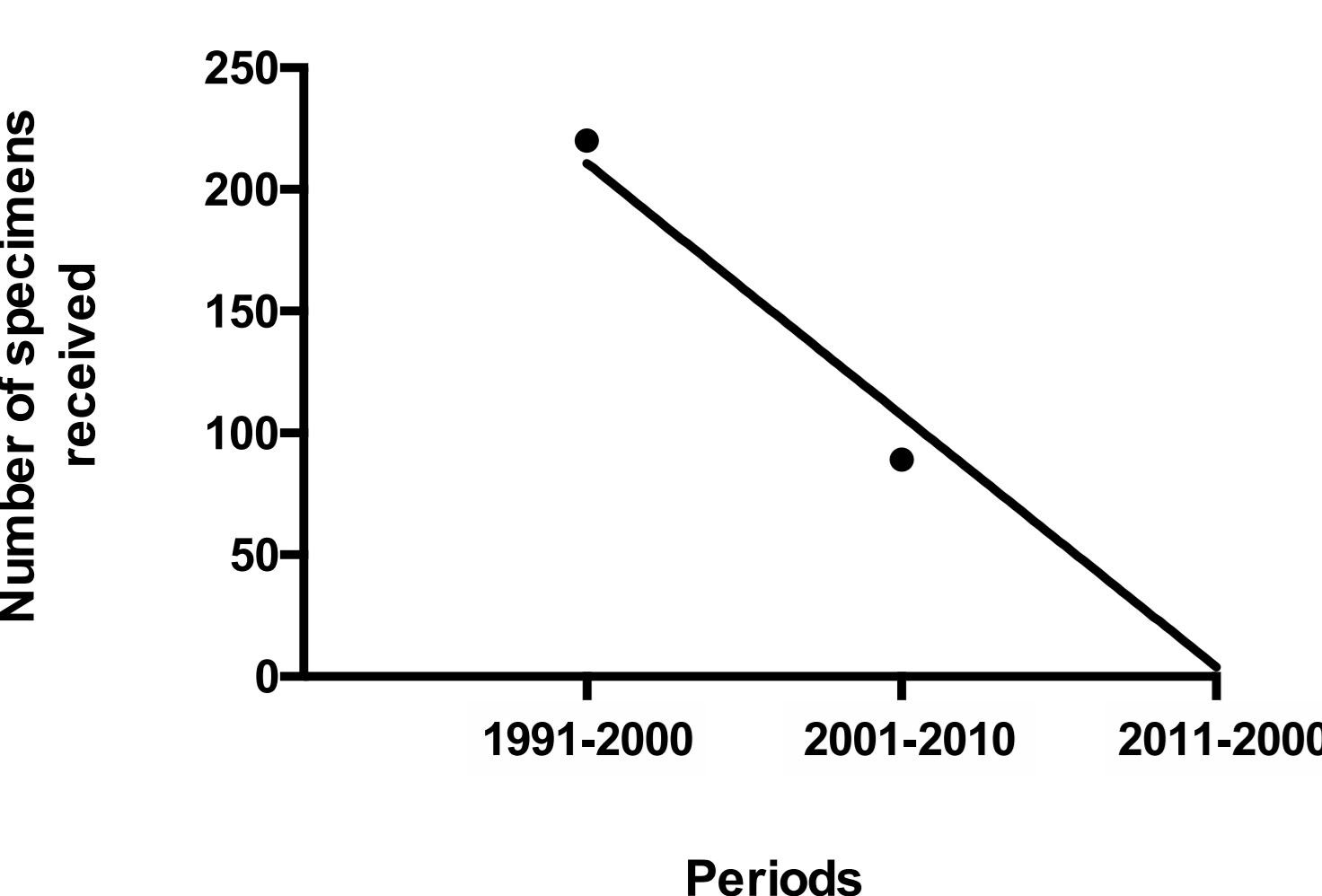


FIGURE 7

Number of milkings and venom yield

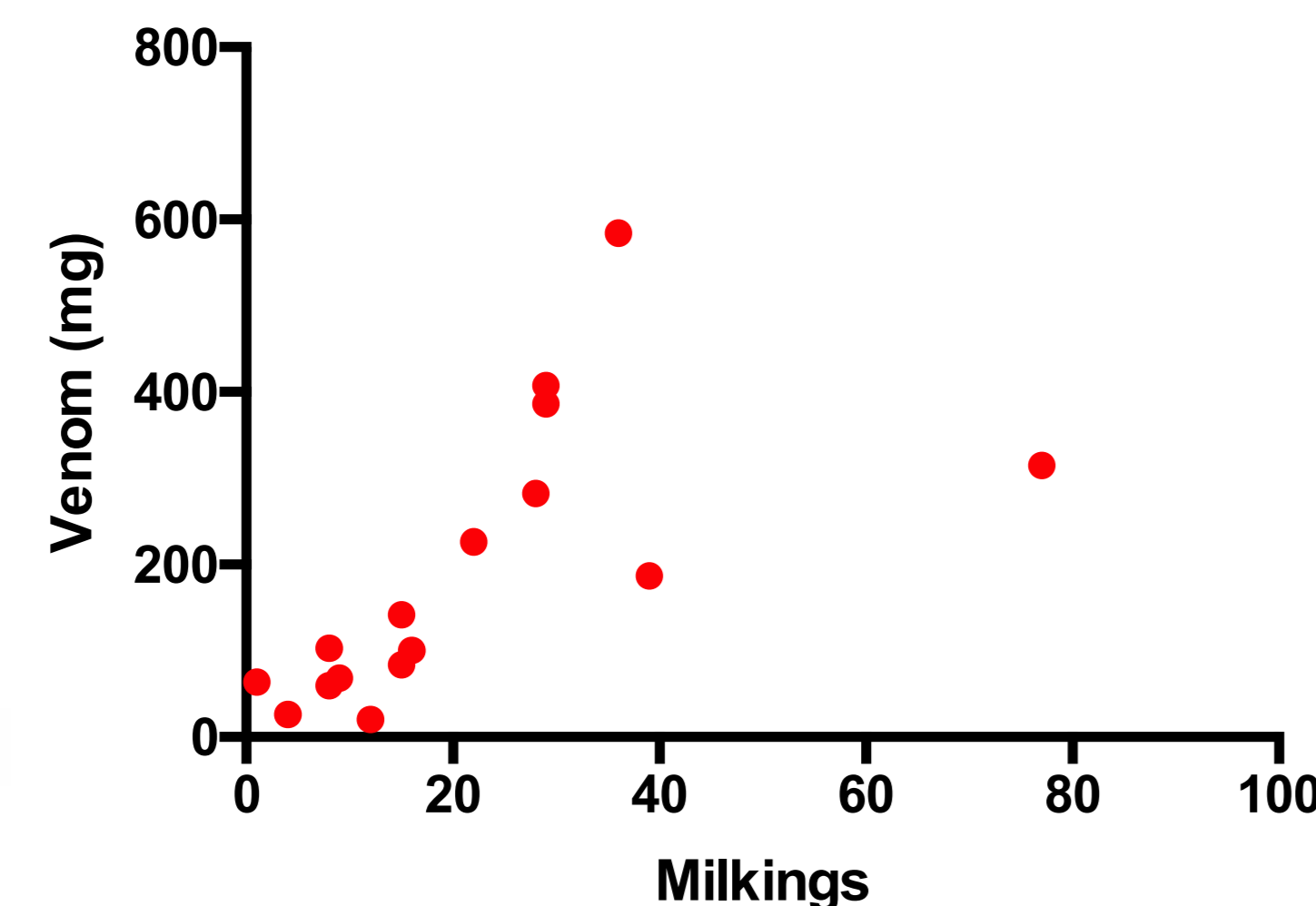


FIGURE 5

Number of milkings by year

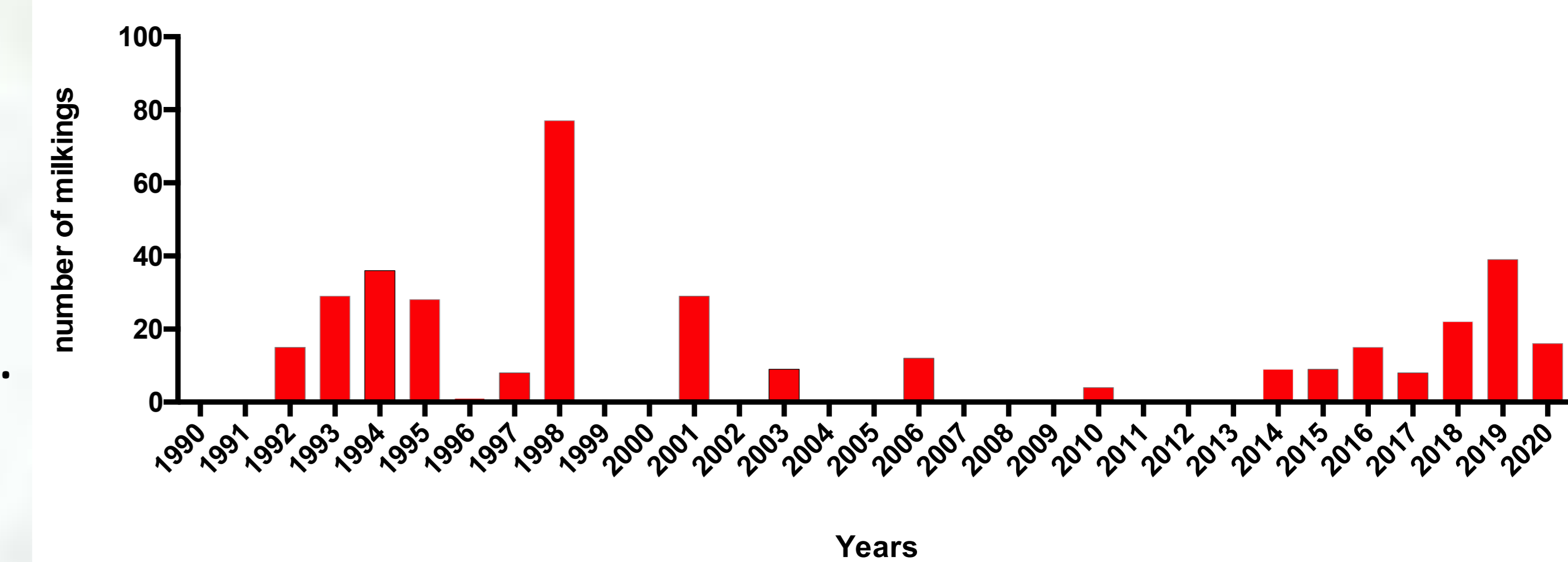
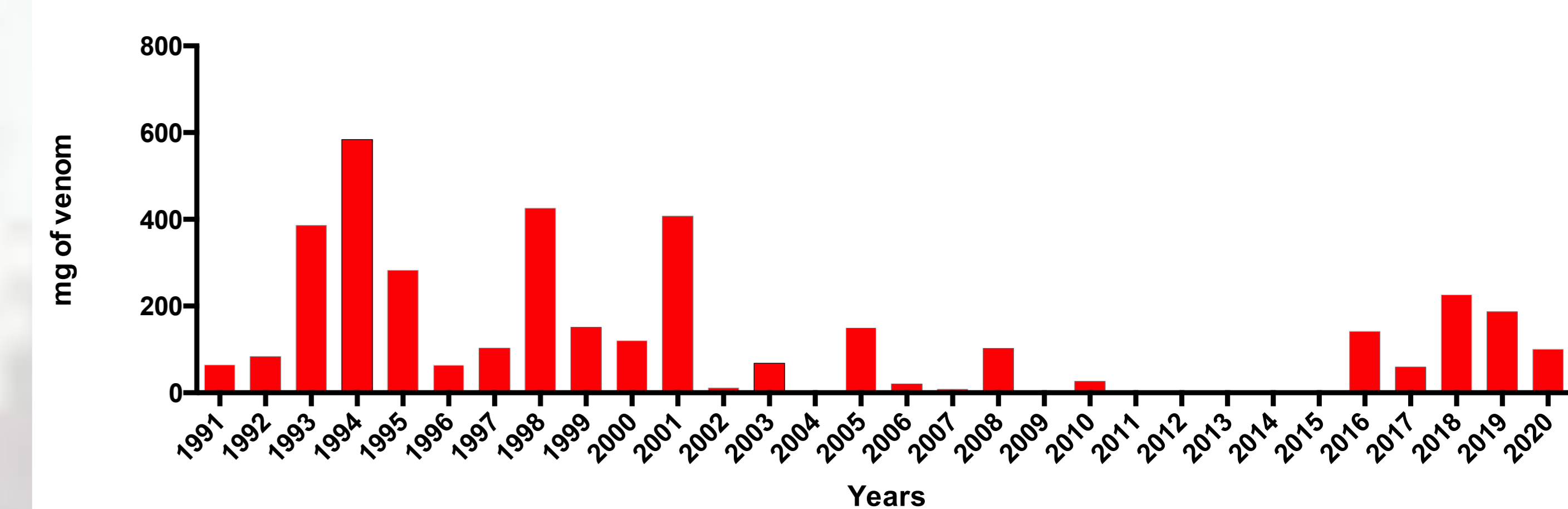


FIGURE 6

Venom yield per year



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